Claims

1. A confocal microscope system for viewing of a section of a medium which receives and returns light both from the section and from sites outside the section that reduces the quality of an image formed from said return light. said svstem comprising a source of light and confocal optics including means for projecting light having components of intensity which are in out of phase relationship and spaced transversely from each other in the section, but are in spatially overlapping relation outside the section from said outside sites, and said confocal optics having a confocal aperture at which said return light from said components is combined for detection, thereby providing for interference of light returned from said outside sites and enabling construction of said image in response to said components from said section.

2. The system of Claim 1 wherein said light is provided by a transverse multi-mode laser source and means are provided for focussing said components at a plurality of spots of incident light in said section.

3. The system of Claim 2 wherein said light is propagated from said source in a TEM mode higher than TEM_{00}.

4. The system of Claim 3 wherein said mode is selected from the group consisting of TEM_{01} TEM_{02} TEM_{03}.

5. The system of Claim 1 wherein source is a multi-mode laser which propagates in the TEM_{01} or higher modes of propagation.

6. The system according to Claim 1 further comprising a condenser for providing said return light and an objective for focusing said spots, thereby providing said microscope for viewing or construction of an image of said section.

7. The system according to Claim 2 further comprising a scanner in the path of said light for scanning said spots with respect to said section.

8. The system according to Claim 7 wherein said scanner is an X-Y scanner, where X and Y are orthogonal directions along said section, an objective focusing said light at said spots, and said objective being movable in a Z direction orthogonal to said X and Y directions.

9. The system according to Claim 7 wherein said scanner is in the path of said incident and return light.

10. The system according to Claim 1q wherein said source is a laser providing a beam of said light which is incident on said medium sheared in a direction traverse to the direction of said beam.

11. The system according to Claim 6 wherein said is a confocal microscope has a splitter passing light received by said medium and deflecting said return light to said condenser, said condenser focusing said return light at said confocal aperture.

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12. A scanning confocal microscope which comprises a laser providing an incident beam, a beam splitter, a scanner for scanning an image plan in a specimen section in generally orthogonal X-Y directions in said plan, said laser being a plural mode laser providing an intensity distribution having a plurality of lobes in out of phase relationship, forming spaced spots in a focal plane in said section and overlapping spots outside of said section, and an objective for focusing said spots in said focal plan, a confocal aperture, a photo detector behind said aperture, and optics for focusing return light deflected by said beam splitter at said aperture.

13. The microscope according to Claim 12 wherein said objective is movable together in a Z direction, generally orthogonal to said X-Y directions thereby selecting different focal plans of said specimen where said spaced spots are incident.

14. An optical coherence imaging system which comprises a laser source providing light which a low temporal coherence and transverse multi-mode beam splitter which directs the light from said source into a reference arm and a sample arm incident on an image plan in a specimen section, a scanner in each sample arm for scanning each specimen in generally orthogonal directions on said plane, and also in said sample arm, an objective having an optical axis for focusing said low temporal coherence light at a plurality of spots offset from each other in a detection arm to which light is directed by said beam splitter from said reference and sample arms and means for providing images in response to interference of light in said detection arm.

15. The system according to Claim 14 wherein said objective is movable in a direction generally orthogonal to said orthogonal directions thereby selecting different image planes in said specimen.

16. The system of Claim 14 wherein said source is a multi-mode laser propagating said incident light in TEM modes higher than the TEM_{00} mode.

17. The system of Claim 14 wherein said beam splitter is a non-polarizing beam splitter.

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